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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/039,615	01/04/2002	Robert F. Wallace	SDK1P007/SDK0296.000US	2529

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BEYER WEAVER & THOMAS LLP
P.O. BOX 778
BERKELEY, CA 94704-0778

EXAMINER

VU, QUANG D

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 06/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/039,615

Applicant(s)

WALLACE, ROBERT F.

Examiner

Quang D Vu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on amendment filed on 03/25/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 16 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 6,399,421 to Han et al.

Regarding claim 16, Han et al. (figure 3) teach a molded semiconductor device package comprising:

a die attach pad (59);

a first (42) and a second (50) semiconductor die, each die having a die bond pad (48, 58), each of the die positioned such that the die bond pads of each die face in opposite directions, the first (42) and second (50) die being connected to opposing surfaces of the die attach pad (59);

a contact lead (62) positioned proximate to the first (42) and second (50) die;

a first gold bonding wire (40) that is stitch bonded to the contact lead (62) and stitch bonded to the die bond pad (48) of the first die (42), wherein the first gold bonding wire (40) was stitch bonded to the contact lead (62) after being stitch bonded to the die bond pad (48);

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a second gold bonding wire (40) that is stitch bonded to the contact lead (62) and stitch bonded to the die bond pad (58) of the second (50) die, wherein the second gold bonding wire (40) was stitch bonded to the contact lead (62) after being stitch bonded to the die bond pad (58); and

a molding cap (66) that encapsulated the first (42) and second (50) die, the first and second bonding wire (40), and a portion of the contact lead (62).

The claim limitations “the first aluminum bonding wire was stitch bonded to the contact lead before being stitch bonded to the die bond pad and the second aluminum bonding wire was stitch bonded to the contact lead before being stitch bonded to the die bond pad” in claim 16 are taken to be product by process limitations which do not carry weight in claim drawn to structure. A product by process claim directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See *In re Fessman*, 180 USPQ 324, 326 (CCPA 1974); *In re Marosi et al.*, 218 USPQ 289, 292 (Fed. Cir. 1983); and particularly *In re Thorpe*, 277 USPQ 964, 966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product “gleaned” from the process steps, which must be determined in a “product by process” claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old and obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not.

Regarding claim 19, Han et al. teach the first die contains integrated circuit components configured to form a memory or a logic unit (column 1, lines 26-29).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,399,421 to Han et al.

Regarding claim 1, Han et al. (figure 3) teach a molded semiconductor device package comprising:

a die attach pad (59);

a first (42) and second (50) semiconductor die, each die having a die bond pad (48, 58), each of the die positioned such that the die bond pads (48, 58) of each die face in opposite directions, the first (42) and second (50) die being connected to opposing surfaces of the die attach pad (59);

a contact lead (62) positioned proximate to the first (42) and second (50) die;

a first bonding wire (40) that is stitch bonded to the die bond pad (48) of the first die (42);

a second bonding wire (40) that is stitch bonded to the die bond pad (58) of the second die (50); and

a molding cap (66) that encapsulates the first (42) and second (50) die, the first and second bonding wire (40), and a portion of the contact lead (62).

Han et al. differ from the claimed invention by not showing the molding cap has a thickness of less than about 1 millimeter. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the molding cap has a thickness of less than about 1 millimeter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 4, Han et al. teach the first bonding wire (40) is also stitch bonded to the contact lead (62) and the second bonding wire (40) is also stitch bonded to the contact lead (62).

Regarding claim 5, Han et al. teach the first and second bonding wire (40) are formed of a material selected from gold (column 4, lines 41-42).

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,399,421 to Han et al. as applied to claim 1 above, and further in view of US Patent No. 5,735,030 to Orcutt.

Regarding claim 2, Han et al. differ from the claimed invention by not showing a first conductive ball formation that is formed between the first bonding wire and the die bond pad of the first die; and a second conductive ball formation that is formed between the second bonding wire and the die bond pad of the second die. However, Orcutt (figure 3) teaches a conductive ball formation (21) that is formed between the bonding wire (1) and the die bond pad (5) of the die (7). It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate a

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conductive ball formation that is formed between the bonding wire and the die bond pad of the die of Orcutt into the device taught by Han et al. because it is desirable to hold the wire securely on the chip. The combined device shows a first conductive ball formation that is formed between the first bonding wire and the die bond pad of the first die; and a second conductive ball formation that is formed between the second bonding wire and the die bond pad of the second die.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,399,421 to Han et al. as applied to claim 1 above, and further in view of US Patent No. 5,735,030 to Orcutt.

Regarding claim 3, Han et al. differ from the claimed invention by not showing the first bonding wire is also ball bonded to the contact lead and the second bonding wire is also ball bonded to the contact lead. However, Orcutt (figure 3) teaches the bonding wire (1) is ball bonded to the contact lead (9). It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the ball bonded bonding wire to the contact lead of Orcutt into the device taught by Han et al. because it is desirable to hold the wire securely on the chip. The combined device shows the first bonding wire is also ball bonded to the contact lead and the second bonding wire is also ball bonded to the contact lead.

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7. Claims 7, 9, 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,399,421 to Han et al. in view of US Patent No. 5,735,030 to Orcutt.

Regarding claim 7, Han et al. (figure 3) teach a molded semiconductor device package comprising:

- a die attach pad (59);

- a first (42) and a second (50) semiconductor die, each die having a die bond pad (48, 58), each of the die (42, 50) positioned such that the die bonds (48, 58) of each die face in opposite directions, the first (42) and second (50) die being connected to opposing surface of the die attach pad (59);

- a contact lead (62) positioned proximate to the first (42) and second (50) die;

- a first bonding wire (40) that is stitch bonded to the die bond pad (48) of the first die (42);

- a second bonding wire (40) that is stitch bonded to the die bond pad (58) of the second die (50); and

- a molding cap (66) that encapsulates the first (42) and second (50) die, the first and second bonding wire (40), and a portion of the contact lead (62).

Han et al. differ from the claimed invention by not showing a first bonding wire that is ball bonded to the contact lead; and a second bonding wire that is ball bonded to the contact lead. However, Orcutt (figure 3) teaches the bonding wire (1) is also ball bonded to the contact lead (9). It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the ball bonded bonding

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wire of Orcutt into the device taught by Han et al. because it is desirable to hold the wire securely on the chip. The combined device shows a first bonding wire that is ball bonded to the contact lead and a second bonding wire that is ball bonded to the contact lead.

Regarding claim 9, Han et al. teach the first and second bonding wire (40) are formed of a material selected from gold (column 4, lines 41-42).

Regarding claim 10, Han et al. differ from the claimed invention by not showing the molding cap has a thickness of less than about 1 millimeter. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the molding cap has a thickness of less than about 1 millimeter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 11, Han et al. teach the first die contains integrated circuit components configured to form a memory or a logic unit (column 1, lines 26-29).

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,399,421 to Han et al. as applied to claim 1 above, and further in view of US Patent No. 6,437,429 to Su et al.

Regarding claim 6, Han et al. differ from the claimed invention by not showing the package is either a thin small outline package or a quad flat pack package. However, Su et al. teach the package is a thin small outline package or a quad flat pack package (column 1, lines 13-20). Therefore, it would have been obvious to one having

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ordinary skill in the art at the time the invention was made to incorporate the teaching of Su et al. into the device taught by Han et al., since it is a conventional semiconductor device package.

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Han et al. and Orcutt as applied to claim 7 above, and further in view of US Patent No. 6,437,429 to Su et al.

Regarding claim 8, Han et al. and Orcutt differ from the claimed invention by not showing the package is either a thin small outline package or a quad flat pack package. However, Su et al. teach the package is a thin small outline package or a quad flat pack package (column 1, lines 13-20). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Su et al. into the device taught by Han et al. and Orcutt, since it is a conventional semiconductor device package.

10. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,399,421 to Han et al. and US Patent No. 5,735,030 to Orcutt.

Regarding claim 12, Han et al. (figure 3) teach a molded semiconductor device package comprising:

a pair of semiconductor dice (42, 50) that are oriented such that a top surface of each die are facing in opposite directions, the top surface of each die having at least one die bond pad (48, 58);

at least one contact lead (62) positioned proximate to the pair of semiconductor dice (42, 50);

a molding cap (66) that encapsulated the pair of semiconductor dice (42, 50), the bonding wire (40) and a portion of the contact lead (62).

Han et al. differ from the claimed invention by not showing a conductive ball formation positioned on the die bond pad and at least one bonding wire that is ball bonded to the contact lead and stitch bonded to the conductive ball formation. However, Orcutt (figure 3) teaches a conductive ball (21) formation that is formed on the die pad (5) and the bonding wire (1) is also ball bonded to the contact lead (9) and stitch bonded to the conductive ball formation (21). It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate a conductive ball formation that is formed on the die pad and the ball bonded bonding wire to the contact lead and stitch bonded to the conductive ball formation of Orcutt into the device taught by Han et al. because it is desirable to hold the wire securely on the chip and the lead.

Regarding claim 13, Han et al. teach a die attach pad (59) that is attached to and sandwiched between the pair of semiconductor dice (42, 50).

Regarding claim 14, Han et al. teach the bonding wire (40) is gold. (column 4, lines 41-42).

Regarding claim 15, Han et al. differ from the claimed invention by not showing the molding cap has a thickness of less than about 1 millimeter. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the

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molding cap has a thickness of less than about 1 millimeter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

11. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,399,421 to Han et al.

Regarding claim 18, Han et al. differ from the claimed invention by not showing the molding cap has a thickness of less than about 1 millimeter. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the molding cap has a thickness of less than about 1 millimeter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

12. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,399,421 to Han et al. as applied to claim 16 above, and further in view of US Patent No. 6,437,429 to Su et al.

Regarding claim 17, Han et al. differ from the claimed invention by not showing the package is either a thin small outline package or a quad flat pack package. However, Su et al. teach the package is a thin small outline package or a quad flat pack package (column 1, lines 13-20). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of

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Su et al. into the device taught by Han et al., since it is a conventional semiconductor device package.

Response to Arguments

Applicant's arguments filed 03/25/03 have been fully considered but they are not persuasive.

It is argued, in page 2 of the remarks, that Han et al. do not teach or suggest stitch bonding a bonding wire to the bond pad of a die. It is also urged that Han et al. do not teach the wires are "put on" in any specific manner. This argument is not convincing because Han et al. teach bonding wire (40) is bonded to the die bond pads (48, 58) of the first die (42) and the second die (50) without using any solder ball material. Therefore, it is believed that the bonding wire (40) is stitch bonded to the die bond pads (48, 58).

It is argued, in page 3 of the remarks, that Han et al. do not teach or suggest the conductive ball formation. This argument is not convincing because the combined device of Han et al. and Orcutt teach the conductive ball formation positioned on the die bond pad and the bonding wire that is ball bonded to the contact lead and stitch bonded to the conductive ball formation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate a conductive ball formation that is formed on the die pad of Orcutt into the device taught by Han et al. because it is desirable to hold the wire securely on the chip and minimize the damage to the wire (column 2, lines 20-27).

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It is argued, in page 3 of the remarks, that Han et al. do not teach or suggest stitch bonding a wire to both a die and a contact lead. This argument is not convincing because Han et al. teach bonding wire (40) is stitch bonded to the die (42) and contact lead (62).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang D Vu whose telephone number is 703-305-3826. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

qv
June 2, 2003

Steven Loke